



INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

We make Indiana a cleaner, healthier place to live.

Frank O'Bannon
Governor

Lori F. Kaplan
Commissioner

100 North Senate Avenue
P. O. Box 6015
Indianapolis, Indiana 46206-6015
(317) 232-8603
(800) 451-6027
www.IN.gov/idem

July 11, 2003

TO: Interested Parties / Applicant
Praxair, Inc.

SPM 089-17479-00435

FROM: Paul Dubenetzky
Chief, Permits Branch
Office of Air Quality

Notice of Decision: Approval - Effective Immediately

Please be advised that on behalf of the Commissioner of the Department of Environmental Management, I have issued a decision regarding the enclosed matter. Pursuant to IC 13-17-3-4 and 326 IAC 2, this permit modification is effective immediately, unless a petition for stay of effectiveness is filed and granted, and may be revoked or modified in accordance with the provisions of IC 13-15-7-1.

If you wish to challenge this decision, IC 4-21.5-3-7 require that you file a petition for administrative review. This petition may include a request for stay of effectiveness and must be submitted to the Office of Environmental Adjudication, ISTA Building, 150 W. Market Street, Suite 618, Indianapolis, IN 46204, **within (18) eighteen days of the mailing of this notice**. The filing of a petition for administrative review is complete on the earliest of the following dates that apply to the filing:

- (1) the date the document is delivered to the Office of Environmental Adjudication (OEA);
- (2) the date of the postmark on the envelope containing the document, if the document is mailed to OEA by U.S. mail; or
- (3) the date on which the document is deposited with a private carrier, as shown by receipt issued by the carrier, if the document is sent to the OEA by private carrier.

The petition must include facts demonstrating that you are either the applicant, a person aggrieved or adversely affected by the decision or otherwise entitled to review by law. Please identify the permit, decision, or other order for which you seek review by permit number, name of the applicant, location, date of this notice and all of the following:

- (1) the name and address of the person making the request;
- (2) the interest of the person making the request;
- (3) identification of any persons represented by the person making the request;
- (4) the reasons, with particularity, for the request;
- (5) the issues, with particularity, proposed for consideration at any hearing; and
- (6) identification of the terms and conditions which, in the judgment of the person making the request, would be appropriate in the case in question to satisfy the requirements of the law governing documents of the type issued by the Commissioner.

(over)

FNTVPMOD.wpd 8/21/02

Pursuant to 326 IAC 2-7-18(d), any person may petition the U.S. EPA to object to the issuance of a Title V operating permit or modification within sixty (60) days of the end of the forty-five (45) day EPA review period. Such an objection must be based only on issues that were raised with reasonable specificity during the public comment period, unless the petitioner demonstrates that it was impracticable to raise such issues, or if the grounds for such objection arose after the comment period.

To petition the U.S. EPA to object to the issuance of a Title V operating permit, contact:

U.S. Environmental Protection Agency
Administrator, Christine Todd Whitman
401 M Street
Washington, D.C. 20406

If you have technical questions regarding the enclosed documents, please contact the Office of Air Quality, Permits Branch at (317) 233-0178. Callers from within Indiana may call toll-free at 1-800-451-6027, ext. 3-0178.

Enclosure

FNTVPMOD..wpd 8/21/02



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July 11, 2003

Mr. Ole Lodberg
Praxair, Inc.
P.O. Box 712
Whiting, Indiana 46394

Re: 089-17479
Significant Permit Modification to
Part 70 Permit No.: 089-11102-00435

Mr. Lodberg:

Praxair, Inc. was issued a permit on April 15, 2002 for a stationary industrial gas manufacturing source. A letter requesting changes to this permit was received by the Office of Air Quality (OAQ) on April 11, 2003. Pursuant to the provisions of 326 IAC 2-7-12, a significant permit modification to this permit is hereby approved as described in the attached Technical Support Document.

The modification consists of changes to the operating requirements for the selective catalytic reduction (SCR) NOx emissions control system on Reformer No. 3. This change is in response to compliance stack testing required by the permit, and performed by the Permittee during November 2002. Changes are also made to related monitoring and record keeping requirements. Also, in response to a plant site visit by IDEM, Northwest Indiana Regional Office during August 2002, the source has requested that a simplified, but more conservative, method of compliance be reflected in the PSD-minor limit for carbon monoxide. IDEM, OAQ, agrees and the relevant changes are made to the emission limit and related monitoring and record keeping conditions.

All other conditions of the permit shall remain unchanged and in effect. Please attach a copy of this modification and the following revised permit pages to the front of the original permit.

This decision is subject to the Indiana Administrative Orders and Procedures Act - IC 4-21.5-3-5. If you have any questions on this matter, please contact Michael Hirtler, c/o OAQ, 100 North Senate Avenue, P.O. Box 6015, Indianapolis, Indiana, 46206-6015, or at 973-575-2555, extension 3229, or in Indiana at 1-800-451-6027.

Sincerely,

Paul Dubenetzky, Chief
Permits Branch
Office of Air Quality

Attachments
MH / EVP

c: File - Lake County
U.S. EPA, Region V
Lake County Health Department
IDEM Northwest Regional Office
Air Compliance Section Inspector - Rick Massoels/Ramesh Tejuja
Compliance Data Section - Karen Ambil
Administrative and Development
Technical Support and Modeling - Michele Boner



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PART 70 OPERATING PERMIT OFFICE OF AIR QUALITY

Praxair, Inc.
2551 Dickey Road
East Chicago, Indiana 46312

(herein known as the Permittee) is hereby authorized to operate subject to the conditions contained herein, the source described in Section A (Source Summary) of this permit.

This permit is issued in accordance with 326 IAC 2 and 40 CFR Part 70 Appendix A and contains the conditions and provisions specified in 326 IAC 2-7 as required by 42 U.S.C. 7401, et. seq. (Clean Air Act as amended by the 1990 Clean Air Act Amendments), 40 CFR Part 70.6, IC 13-15 and IC 13-17. This permit and the conditions listed herein replace and supercede Federally Enforceable State Operating Permit No. F089-5553-00184, issued pursuant to 326 IAC 2-8 on June 13, 1997.

Operation Permit No.: T089-11102-00435	
Issued by: Janet G. McCabe, Assistant Commissioner Office of Air Quality	Issuance Date: April 15, 2002 Expiration Date: April 15, 2007

First Administrative Amendment No.: 089-16195-00435

Issuance Date: August 9, 2002

First Significant Permit Modification No.: 089-17479-00435	Pages Modified: 2, 31, 32, 34 - 37
Issued by: Original signed by Paul Dubenetzky Paul Dubenetzky, Branch Chief Office of Air Quality	Issuance Date: July 11, 2003

Compliance Requirements [326 IAC 2-1.1-11]

C.9 Compliance Requirements [326 IAC 2-1.1-11]

Compliance Monitoring Requirements [326 IAC 2-7-5(1)] [326 IAC 2-7-6(1)]

- C.10 Compliance Monitoring [326 IAC 2-7-5(3)] [326 IAC 2-7-6(1)]
- C.11 Maintenance of Emission Monitoring Equipment [326 IAC 2-7-5(3)(A)(iii)]
- C.12 Monitoring Methods [326 IAC 3] [40 CFR 60] [40 CFR 63]
- C.13 Instrument Specifications [326 IAC 2-1.1-11] [326 IAC 2-7-5(3)] [326 IAC 2-7-6(1)]

Corrective Actions and Response Steps [326 IAC 2-7-5] [326 IAC 2-7-6]

- C.14 Emergency Reduction Plans [326 IAC 1-5-2] [326 IAC 1-5-3]
- C.15 Risk Management Plan [326 IAC 2-7-5(12)] [40 CFR 68.215]
- C.16 Compliance Response Plan - Preparation, Implementation, Records, and Reports
- C.17 Actions Related to Noncompliance Demonstrated by a Stack Test [326 IAC 2-7-5]

Record Keeping and Reporting Requirements [326 IAC 2-7-5(3)] [326 IAC 2-7-19]

- C.18 Emission Statement [326 IAC 2-7-5(3)(C)(iii)] [326 IAC 2-7-5(7)] [326 IAC 2-7-19(c)]
- C.19 General Record Keeping Requirements [326 IAC 2-7-5(3)] [326 IAC 2-7-6]
- C.20 General Reporting Requirements [326 IAC 2-7-5(3)(C)] [326 IAC 2-1.1-11]

Stratospheric Ozone Protection

- C.21 Compliance with 40 CFR 82 and 326 IAC 22-1

D.1 FACILITY OPERATION CONDITIONS - Three (3) Reformers, A3, A8 and A11; One Carbon Dioxide Purification System, A9; One (1) Natural Gas Fired Boiler, A7; and Two (2) Diesel Fired Emergency Generators, A13 and A15 30

Emission Limitations and Standards [326 IAC 2-7-5(1)]

- D.1.1 Particulate Matter (PM) [326 IAC 6-2-4]
- D.1.2 PSD Minor Limit [326 IAC 2-2]
- D.1.3 Emission Offset Minor Limit [326 IAC 2-3]
- D.1.4 Ammonia Limitation
- D.1.5 Preventive Maintenance Plan [326 IAC 2-7-5(13)]

Compliance Determination Requirements

- D.1.6 Testing Requirements [326 IAC 2-7-6(1),(6)] [326 IAC 2-1.1-11]
- D.1.7 Selective Catalytic Reduction (SCR) System
- D.1.8 CO and NO_x Emissions

Compliance Monitoring Requirements [326 IAC 2-7-6(1)] [326 IAC 2-7-5(1)]

- D.1.9 Parametric Monitoring

Record Keeping and Reporting Requirements [326 IAC 2-7-5(3)] [326 IAC 2-7-19]

- D.1.10 Record Keeping Requirements
- D.1.11 Reporting Requirements

D.2 FACILITY OPERATION CONDITIONS - Insignificant Activities 38

Emission Limitations and Standards [326 IAC 2-7-5(1)]

Record Keeping and Reporting Requirements [326 IAC 2-7-5(3)] [326 IAC 2-7-19]

D.1.2 PSD Minor Limit [326 IAC 2-2]

Pursuant to CP 089-10413-00435, issued June 2, 1999, the source shall comply as follows:

- (a) The total carbon monoxide (CO) production rate from process vent stacks of Reformer Nos. 1, 2, and 3 (S/V 006, 010, and 012, respectively) shall be limited to 5.45 million standard cubic feet (MMscf) per twelve (12) consecutive month period, based on:
 - (1) CO density of 0.072 pounds per cubic foot of gas produced at standard conditions (i.e., 1 atmosphere of pressure and 70 degrees Fahrenheit temperature).
 - (2) CO concentrations established through performance testing pursuant to Condition D.1.6(b) for each process vent connected to, and exhausting at, stacks S/V 006, 010 and 012 during startup of Reformers 1, 2 and 3, respectively. Process vent CO concentrations shall be adjusted as necessary based on the results of the most recently approved performance test.
- (b) Instrumentation that continuously computes the amount of CO vented at each process vent connected to stacks S/V 006, 010 and 012, as a function of the duration of vent valve opening, shall be permanently installed on Reformer Nos. 1, 2, and 3 and shall be tested in accordance with Condition D.1.6(b).
- (c) This production limit is equivalent to limiting total CO emissions from the process vent stacks of Reformer Nos. 1, 2, and 3 (S/V 006, 010, and 012, respectively) to 196.1 tons per 12 consecutive month period. Compliance with this condition shall limit the source-wide potential to emit CO to less than 250 tons per 12 consecutive month period, including the potential to emit CO for other existing facilities. Therefore, the Prevention of Significant Deterioration (PSD) rules, 326 IAC 2-2, do not apply.

D.1.3 Emission Offset Minor Limit [326 IAC 2-3]

Pursuant to CP 089-10413-00435, issued June 2, 1999, the source shall comply as follows:

- (a) The total amount of NO_x emitted from Reformer Nos. 1, 2, 3, and Boiler No. 3, shall be limited to thirty-one and ninety-five one-hundredths (31.95) tons per twelve (12) consecutive month period, derived from Equation (1) below. Compliance with this limit shall be determined through an equivalent fuel usage limit of 1,972 million standard cubic feet (MMscf) per 12 consecutive month period using Equation (2). The algebraic formulae follow:

Equation (1):

$32.4 \text{ AA} + 9.42 \text{ BB} + 25 \text{ NN} \leq 63,900$ pounds NO_x per 12 consecutive month period

where: AA = Reformer Nos1 & 2 annual fuel consumption (MMscf/12-months)
BB = Reformer No.3 annual fuel consumption (MMscf/12-months)
NN = Boiler No.3 annual fuel consumption (MMscf/12-months)
32.4 = Reformer Nos. 1 and 2 emission factor in pounds NO_x per million standard cubic feet (MMscf) of fuel consumed (lb NO_x / MMscf)
9.42 = Reformer No. 3 emission factor (lb NO_x / MMscf)
25 = Boiler No. 3 emission factor (lb NO_x / MMscf)

Equation (2):

$AA + 0.291 BB + 0.772 NN \# 1,972$ equivalent MMscf per 12 consecutive months

The fuel usage limit of Equation (2) is an equivalent reduced form of Equation (1), derived using a common divisor of 32.4 pounds of NO_x per MMscf. Therefore, compliance with the fuel usage limit established in Equation (2) shall satisfy the NO_x limit of 31.95 tons per 12 consecutive month period.

- (b) The annual fuel consumption at Reformer Nos. 1, 2, and 3, as natural gas plus tail gas, input to Equation (2) shall be determined using Equations (3) and (4) as follows:

Equation (3):

$AA = 1.073 * Fd1 + 1.147 * Fd2$

Equation (4):

$BB = 1.273 * Fd3$

where: Fd1 = natural gas feedstock flow to Reformer No. 1 in MMscf/12-months

Fd2 = natural gas feedstock flow to Reformer No. 2 in MMscf/12-months

Fd3 = natural gas feedstock flow to Reformer No. 3 in MMscf/12-months

- (c) The coefficients in Equations (1), (2), (3), and (4) shall be adjusted as necessary, based on the results of the most recent performance test. If other coefficients are relied upon after issuance of this permit, the Permittee shall submit a request to IDEM, OAQ to amend this permit before utilization of the coefficients.
- (d) The two (2) emergency generators A13 and A15 will limit combined NO_x emissions to 1.0 ton per year by limiting the operating hours of the respective 100 kW and 320 kW emergency generators to 100 hours per 12 consecutive month period each.

These limitations are equivalent to a NO_x emissions increase of less than 25 tons per twelve (12) consecutive month period due to the source modification, based on 7.96 tons per year of actual NO_x emissions prior to the modification. Therefore, the Emission Offset rules, 326 IAC 2-3, do not apply.

D.1.4 Ammonia Limitation

Pursuant to 326 IAC 2-1.1-5 (Air Quality Requirements), the concentration of ammonia at the Reformer No. 3 exhaust stack (S/V 011) shall not exceed twenty (20) parts per million by volume, dry (ppmvd) at three percent (3%) oxygen.

D.1.5 Preventive Maintenance Plan [326 IAC 2-7-5(13)]

A Preventive Maintenance Plan, in accordance with Section B - Preventive Maintenance Plan, of this permit, is required for these facilities and control device.

Compliance Determination Requirements

D.1.6 Testing Requirements [326 IAC 2-7-6(1),(6)] [326 IAC 2-1.1-11]

- (a) During the period within 90 days after issuance of this permit, and utilizing applicable methods as approved by the Commissioner, the Permittee shall establish:

- (1) the maximum ammonia injection rate for compliance with Condition D.1.4; and

- (v) average percent (%) oxygen (O_2) in the flue gas of the two (2) Reformer No. 3 cans, on a wet basis.

Testing shall be repeated at least once every five years from the date of this valid compliance demonstration.

- (B) During the period between 18 to 24 months after issuance of this permit, the Permittee shall test the SCR catalyst for degradation to confirm the efficiency of the control device. As recommended by the SCR vendor, this test shall be repeated at least once every two (2) years from the date of this valid compliance demonstration.

D.1.7 Selective Catalytic Reduction (SCR) System

The Permittee shall operate the Reformer No. 3 SCR control system as follows:

- (a) In order to comply with Condition D.1.3, the minimum SCR control system downstream temperature shall not be less than 550 degrees Fahrenheit (EF), and the rate of ammonia (NH_3) injected to the SCR unit shall not be less than that determined by performance testing and shall be continuously computed using Equation (5) as follows:

Equation (5):

$$NH_3 \text{ injection rate (pounds per hour)} = (0.328 + 1.258 * O_2) * ORF$$

where: O_2 = average percent (%) oxygen (O_2) in the flue gas of the two (2) Reformer No. 3 cans, on a wet basis, and

ORF = Reformer No. 3 operating rate fraction (ORF), expressed as a fraction of the reformer design firing rate.

- (b) In order to comply with Condition D.1.4, the rate of ammonia (NH_3) injected to the SCR unit shall be maintained at a level that does not exceed that determined by performance testing and shall be continuously computed using Equation (6):

Equation (6):

$$NH_3 \text{ injection rate (pounds per hour)} = (0.668 + 1.258 * O_2) * ORF$$

where: O_2 = average percent (%) oxygen (O_2) in the flue gas of the two (2) Reformer No. 3 cans, on a wet basis

ORF = Reformer No. 3 operating rate fraction (ORF), expressed as a fraction of the reformer design firing rate

- (c) The coefficients in Equations (5) and (6) shall be adjusted as necessary, based on the results of the most recent performance test approved by IDEM, OAQ. If other coefficients are relied upon after issuance of this permit, the Permittee shall submit a request to IDEM, OAQ, to modify this permit before utilization of the coefficients.

- (d) Reformer No. 3 SCR system shall operate at all times that the process is in operation. When operating, the SCR system shall maintain ammonia injection rates within the range determined from the most recent compliance stack test, as approved by IDEM. The minimum ammonia injection rate correlates to a NO_x reduction efficiency (percent, %) determined from the latest performance test.

D.1.8 CO and NO_x Emissions

Compliance with Conditions D.1.2 and D.1.3 shall be demonstrated within 30 days of the end of each month, respectively based on the total carbon monoxide (CO) produced and the total fuel usage for the most recent twelve (12) month period.

Compliance Monitoring Requirements [326 IAC 2-7-6 (1)] [326 IAC 2-7-5 (1)]

D.1.9 Parametric Monitoring

- (a) A continuous monitoring system shall be calibrated, maintained, and operated on each process vent connected to, and exhausting at, stacks S/V 006, 010 and 012 during startup of Reformers 1, 2 and 3, respectively, for measuring duration of vent valve openings. The output of this system shall be recorded to continuously compute the amount of carbon monoxide vented to demonstrate compliance with Condition D.1.2.
- (b) A continuous monitoring system shall be calibrated, maintained, and operated on Reformer No. 3 for measuring:
 - (1) the oxygen content (percent, %) in the flue gas of the two reformer cans, on a wet basis;
 - (2) the capacity of the facility as a fraction of the design firing rate;
 - (3) the SCR system downstream temperature (EF); and
 - (4) the amount of ammonia injected to the facility's selective catalytic reduction (SCR) system.

The output of this system shall be recorded, and the minimum downstream temperature and ammonia injection rate shall not be less than the minimum temperature and injection rate established at D.1.7(a), nor greater than the maximum injection rate established at D.1.7(b), based on the most recent compliance stack test.

- (c) The Permittee shall take all reasonable response steps in accordance with Section C - Compliance Response Plan - Preparation, Implementation, Records, and Reports for these units when the temperature or ammonia injection rate is outside the above mentioned range for any one reading. A temperature or ammonia injection rate reading that is outside of the above mentioned range is not a deviation from the permit. Failure to take response steps in accordance with Section C - Compliance Response Plan - Preparation, Implementation, Records, and Reports, shall be considered a violation of this permit.
- (d) The instruments used for determining parameter measurements shall comply with Section C - Instrument Specifications, of this permit, shall be subject to approval by IDEM, OAQ, and shall be calibrated at least once every six (6) months. Calibration of the reformer process vent valve monitoring system shall include a procedure that verifies functionality of open/closed valve operations.

- (e) Additional inspections and preventive measures shall be performed as prescribed in the Preventive Maintenance Plan.

Record Keeping Requirements [326 IAC 2-7-5(3)] [326 IAC 2-7-19]

D.1.10 Record Keeping Requirements

- (a) Pursuant to 40 CFR Part 60.48c (Reporting and Record Keeping Requirements):
 - (1) Records shall be maintained of the amount of natural gas combusted during each month by Boiler No. 3, rated at 38.8 million Btu per hour. [40 CFR Part 60.48c(g)]
 - (2) These records shall be maintained for a period of at least the past 24 months and be made available upon request to the Office of Air Quality (OAQ). [40 CFR Part 60.48c(i)]
- (b) To document compliance with Conditions D.1.2, D.1.3, and D.1.4, the Permittee shall maintain records in accordance with (1) through (5) below. Records maintained for (1) through (5) shall be taken continuously, except where otherwise indicated. Including paragraph (a)(1) of this condition, the records shall be complete and sufficient to establish compliance with the CO and NO_x emission limits respectively established in Conditions D.1.2 and D.1.3, and the ammonia emission limit of D.1.4.
 - (1) The continuous records for Reformer Nos. 1, 2 and 3 as follows:
 - (A) vent valve opening duration for each process vent connected to, and exhausting at, stacks S/V 006, 010 and 012 during startup of Reformers 1, 2 and 3, respectively; and
 - (B) carbon monoxide production at Reformer Nos. 1, 2 and 3 process vent stacks (S/V006, 010 and 012, respectively) and the continuously computed amount of carbon monoxide emitted.
 - (2) The continuous records for Reformer No. 3 as follows:
 - (A) average flue gas oxygen content of the reformer cans (percent, %, wet);
 - (B) capacity as a fraction of design firing rate;
 - (C) continuous records of the SCR system downstream temperature (EF); and
 - (D) ammonia injection rate (pounds per hour) to the SCR system and the minimum and maximum ammonia injection rate used to demonstrate compliance during the most recent compliance stack test.
 - (3) The continuous records for Reformer Nos. 1, 2 and 3 as follows:
 - (A) feedstock flow rate (standard cubic feet per hour); and
 - (B) continuously computed fuel (as natural gas plus tail gas) consumption rate and facility ratios of natural gas plus tail gas to feedstock flow rate used to demonstrate compliance during the most recent compliance stack test.

- (4) The amount of carbon monoxide (CO) emitted for each compliance period (tons per month).
- (5) The amount of nitrogen oxides (NO_x) emitted for each compliance period (tons per month).
- (c) To document compliance with Conditions D.1.5 and D.1.9, the Permittee shall maintain a log of those inspections prescribed by the Preventive Maintenance Plan.
- (d) All records shall be maintained in accordance with Section C - General Record Keeping Requirements, of this permit.

D.1.11 Reporting Requirements

The Permittee shall submit the following:

- (a) A quarterly summary of the information to document compliance with Conditions D.1.2 and D.1.3.
- (b) Certify semi-annually on the form provided that natural gas was fired in Boiler 3 at all times during the reporting period.

The reports shall be submitted to the addresses listed in Section C - General Reporting Requirements, of this permit, using the reporting forms located at the end of this permit, or their equivalent, within thirty (30) days after the end of the period being reported. The report submitted by the Permittee does require the certification by the "responsible official" as defined by 326 IAC 2-7-1(34).

**Indiana Department of Environmental Management
Office of Air Quality**

**Technical Support Document (TSD) for a
Significant Permit Modification to a Part 70 Operating Permit**

Source Background and Description

Source Name:	Praxair, Inc.
Source Location:	2551 Dickey Road, East Chicago, Indiana 46312
County:	Lake
SIC Code:	2813
Operation Permit No.:	T089-11102-00435
Operation Permit Issuance Date:	April 15, 2002
Significant Permit Modification No.:	089-17479-00435
Permit Reviewer:	Michael Hirtler / EVP

The Office of Air Quality (OAQ) has reviewed a modification application from Praxair, Inc. relating to the operation of this existing industrial gas manufacturing source.

History

On April 11, 2003, Praxair, Inc. submitted an application to the OAQ requesting a permit modification to change conditions of the existing Part 70 permit. Praxair, Inc. was issued Part 70 Operating Permit No. T089-11102-00435 on April 15, 2002.

Explanation of Modification

The permit modification will consist of the following:

- (a) Condition D.1.7 of Part 70 permit No. T089-11102-00435 establishes minimum and maximum ammonia (NH_3) injection rates to the existing selective catalytic reduction (SCR) NOx emissions control system on Reformer No. 3. These rates are established by formulae that require stack testing for final parameter determination. Condition D.1.7 requires the Permittee to modify the permit after IDEM has validated the completed stack testing. IDEM, OAQ, validated the testing in February 2003, and Condition D.1.7 and related monitoring and record keeping requirements are revised accordingly.
- (b) IDEM, Northwest Indiana Regional Office, conducted a plant site visit during August 2002. At that time, IDEM observed that the valve used to release excess gas, including carbon monoxide (CO), during startup of Reformer No. 3 did not have a sensor to determine the percent of full-valve opening. Pursuant to Condition D.1.2(a) of Part 70 permit No. T089-11102-00435, the source is required to install instrumentation that continuously computes the amount of CO vented at each process vent, as a function of the duration and amount of vent valve opening. Rather than apportion the vented gas as a function of the amount of vent valve opening, Praxair demonstrated to IDEM that they instead simply record when the valve is open and shut, and assume that 100% of the gas is vented whenever the valve is open. Based on this more conservative method of operation, Praxair submitted a request on August 29, 2002 to IDEM, Northwest Indiana Regional Office, to modify the permit to remove reference to the percent of vent valve opening. The affected Section D.1 conditions are modified pursuant to the Permittee's request.

Existing Approvals

The source was issued a Part 70 Operating Permit T089-11102-00435 on April 15, 2002. The source has since received the following:

First Administrative Amendment No.: 089-16195-00435, issued August 9, 2002.

Recommendation

The staff recommends to the Commissioner that the Significant Permit Modification be approved. This recommendation is based on the following facts and conditions:

Unless otherwise stated, information used in this review was derived from the application and additional information submitted by the applicant.

An application for the purposes of this review was received on April 11, 2003 and August 29, 2002.

Emission Calculations

The permit modification will not result in any new emissions.

Justification for the Modification

The Part 70 Operating permit is being modified through a Part 70 Significant Permit Modification. This modification is being performed pursuant to 326 IAC 2-7-12(d)(1) for a request that does not qualify as a minor permit modification or administrative amendment, and is considered as a significant change to existing permit terms and conditions, including reporting and record keeping.

County Attainment Status

The source is located in Lake County.

Pollutant	Status
PM-10	moderate nonattainment
SO ₂	nonattainment (primary standard)
NO ₂	attainment
Ozone	severe nonattainment
CO	attainment
Lead	attainment

- (a) Volatile organic compounds (VOC) are precursors for the formation of ozone. Therefore, VOC emissions are considered when evaluating the rule applicability relating to the ozone standards. Lake County has been designated as severe nonattainment for ozone. Therefore, VOC emissions were reviewed pursuant to the requirements for Emission Offset, 326 IAC 2-3.
- (b) A portion of Lake County has been classified as nonattainment for particulate matter with an aerodynamic diameter less than or equal to 10 micrometers (PM-10) and sulfur dioxide (SO₂, primary standard only). The source is located in East Chicago which is in the PM-10 and SO₂ nonattainment portions of Lake County. Therefore, source emissions of PM-10 and SO₂ were reviewed pursuant to the requirements for Emission Offset, 326 IAC 2-3.

- (c) Lake County has been classified as attainment for the remaining criteria pollutants. Therefore, source emissions for the remaining criteria pollutants were reviewed pursuant to the requirements for Prevention of Significant Deterioration (PSD), 326 IAC 2-2.

Federal and State Rule Applicability

There are no new federal or state rules applicable to this permit modification, as the changes presented herein do not involve construction of a new emissions unit, nor the modification or reconstruction of an existing emissions unit.

Changes to the Part 70 Permit Due to This Modification:

The following changes are made as the Significant Permit Modification to Part 70 No. T089-11102-00435. New language is shown in **bold** and deleted language is shown with a line through it for emphasis).

1. Condition D.1.2 is revised to eliminate reference to the amount of the vent valve opening used in the determination of the CO production rate. No apportionment of gas is applied during periods of CO production; when the valve is open, all gas is assumed as emitted. Also, the citation of 40 CFR 52.21 is removed from the condition. On March 3, 2003, U.S. EPA published a notice for "Conditional Approval of Implementation Plan: Indiana" in the Federal Register / Vol. 68, No.41 at pages 9892 through 9895. This notice grants conditional approval to the PSD State Implementation Plan (SIP) under provisions of 40 CFR §51.166 and 40 CFR §52.770 while superceding the delegated PSD SIP authority under 40 CFR §52.793. The effective date for these provisions is April 2, 2003. Therefore, PSD permits will be issued under the authority of 326 IAC 2-2 and will no longer be issued under the provision of 40 CFR 52.21 and 40 CFR 124. The condition is modified as follows, with the citation also removed from the Table of Contents without replication below:

D.1.2 PSD Minor Limit [326 IAC 2-2] ~~[40 CFR 52.21]~~

Pursuant to CP 089-10413-00435, issued June 2, 1999, the source shall comply as follows:

- (a) The total carbon monoxide (CO) production rate from process vent stacks of Reformer Nos. 1, 2, and 3 (S/V 006, 010, and 012, respectively) shall be limited to 5.45 million standard cubic feet (MMscf) per twelve (12) consecutive month period, based on:
 - (1) CO density of 0.072 pounds per cubic foot of gas produced at standard conditions (i.e., 1 atmosphere of pressure and 70 degrees Fahrenheit temperature).
 - (2) CO concentrations established through performance testing pursuant to Condition D.1.6(b) for each process vent connected to, and exhausting at, stacks S/V 006, 010 and 012 during startup of Reformers 1, 2 and 3, respectively. Process vent CO concentrations shall be adjusted as necessary based on the results of the most recently approved performance test.
- (b) Instrumentation that continuously computes the amount of CO vented at each process vent connected to stacks S/V 006, 010 and 012, as a function of the duration ~~and amount~~ of vent valve opening, shall be permanently installed on Reformer Nos. 1, 2, and 3 and shall be tested in accordance with Condition D.1.6(b).

- (c) This production limit is equivalent to limiting total CO emissions from the process vent stacks of Reformer Nos. 1, 2, and 3 (S/V 006, 010, and 012, respectively) to 196.1 tons per 12 consecutive month period. Compliance with this condition shall limit the source-wide potential to emit CO to less than 250 tons per 12 consecutive month period, including the potential to emit CO for other existing facilities. Therefore, the Prevention of Significant Deterioration (PSD) rules, 326 IAC 2-2 and ~~40 CFR 52.24~~, do not apply.
2. Condition D.1.4 of the original Part 70 permit incorrectly established the ammonia emission limit at fifteen percent (15%) oxygen. This limit is revised to reflect three percent (3%) oxygen as the appropriate correction factor.

D.1.4 Ammonia Limitation

Pursuant to 326 IAC 2-1.1-5 (Air Quality Requirements), the concentration of ammonia at the Reformer No. 3 exhaust stack (S/V 011) shall not exceed twenty (20) parts per million by volume, dry (ppmvd) at ~~fifteen percent (15%)~~ **three percent (3%)** oxygen.

3. Condition D.1.7 establishes minimum and maximum ammonia (NH₃) injection rate formulae for the selective catalytic reduction (SCR) NO_x emissions control system on Reformer No. 3. The formulae are revised based on stack tests conducted in November 2002 and validated by IDEM, OAQ, during February 2003. The condition is also revised to reflect the minimum SCR outlet temperature of 550EF for NO_x control, as determined during the November 2002 testing, which should be in Equation 5 instead of Equation 6. Condition D.1.7 is modified as follows:

D.1.7 Selective Catalytic Reduction (SCR) System

The Permittee shall operate the Reformer No. 3 SCR control system as follows:

- (a) In order to comply with Condition D.1.3, the **minimum SCR control system downstream temperature shall not be less than 550 degrees Fahrenheit (EF), and the rate of ammonia (NH₃) injected to the SCR unit shall not be less than that determined by performance testing and shall be continuously computed using Equation (5) as follows:**

Equation (5):

$$\text{NH}_3 \text{ injection rate (pounds per hour)} = (\mathbf{0.420.328} + 1.258 * \text{O}_2) * \text{ORF}$$

where: O₂ = average percent (%) oxygen (O₂) in the flue gas of the two (2) Reformer No. 3 cans, on a wet basis, **and**

ORF = Reformer No. 3 operating rate fraction (ORF), expressed as a fraction of the reformer design firing rate.

~~The coefficients in Equation (5) shall be adjusted as necessary, based on the results of the most recent performance test. If other coefficients are relied upon after issuance of this permit, the Permittee shall submit a request to IDEM, OAQ to amend this permit before utilization of the coefficients.~~

- (b) In order to comply with Condition D.1.4, the rate of ammonia (NH₃) injected to the SCR unit shall be maintained at a level that does not exceed that determined by performance testing and shall be continuously computed using Equation (6):

Equation (6):

$$\text{NH}_3 \text{ injection rate (pounds per hour)} = (\mathbf{a0.668} + \mathbf{b1.258} * \text{O}_2 + \mathbf{c*F}) * \text{ORF}$$

where: O₂ = average percent (%) oxygen (O₂) in the flue gas of the two (2) Reformer No. 3 cans, on a wet basis

ORF = Reformer No. 3 operating rate fraction (ORF), expressed as a fraction of the reformer design firing rate

~~T = SCR system downstream temperature, EF
a,b,c = algebraic constants, determined by testing~~

~~The coefficients in Equation (6) shall be established pursuant to Condition D.1.6(a). Upon completion of initial performance testing, the Permittee shall submit a request to IDEM, OAQ to amend this permit condition to establish a final Equation (6). If other coefficients are relied upon after initial testing, the Permittee shall submit a request to IDEM, OAQ to amend this permit before utilization of the coefficients.~~

- (c) **The coefficients in Equations (5) and (6) shall be adjusted as necessary, based on the results of the most recent performance test approved by IDEM, OAQ. If other coefficients are relied upon after issuance of this permit, the Permittee shall submit a request to IDEM, OAQ, to modify this permit before utilization of the coefficients.**
 - (d) Reformer No. 3 SCR system shall operate at all times that the process is in operation. When operating, the SCR system shall maintain ammonia injection rates within the range determined from the most recent compliance stack test, as approved by IDEM. The minimum ammonia injection rate correlates to a NO_x reduction efficiency (percent, %) determined from the latest performance test.
4. Condition D.1.9 is revised to reflect similar changes already made to Conditions D.1.2 and D.1.7 described above. Also, D.1.9(d) is modified to reflect the facility specific procedure used by the source to confirm (i.e., calibrate) the functionality of the vent valve open/close monitoring system.

D.1.9 Parametric Monitoring

- (a) A continuous monitoring system shall be calibrated, maintained, and operated on each process vent connected to, and exhausting at, stacks S/V 006, 010 and 012 during startup of Reformers 1, 2 and 3, respectively, for measuring duration ~~and amount~~ of vent valve openings. The output of this system shall be recorded to continuously compute the amount of carbon monoxide vented to demonstrate compliance with Condition D.1.2.
- (b) A continuous monitoring system shall be calibrated, maintained, and operated on Reformer No. 3 for measuring:
 - (1) the oxygen content (percent, %) in the flue gas of the two reformer cans, on a wet basis;
 - (2) the capacity of the facility as a fraction of the design firing rate;
 - (3) the SCR system downstream temperature (EF); and
 - (4) the amount of ammonia injected to the facility's selective catalytic reduction (SCR) system.

The output of this system shall be recorded, and the **minimum downstream temperature and** ammonia injection rate shall not be less than the minimum **temperature and** injection rate established at D.1.7(a), nor greater than the maximum injection rate established at D.1.7(b), based on the most recent compliance stack test.

- (c) The Permittee shall take all reasonable response steps in accordance with Section C - Compliance Response Plan - Preparation, Implementation, Records, and Reports for these units when the **temperature or** ammonia injection rate is outside the above mentioned range for any one reading. ~~An temperature or~~ ammonia injection rate reading that is outside of the above mentioned range is not a deviation from the permit. Failure to take response steps in accordance with Section C - Compliance Response Plan - Preparation, Implementation, Records, and Reports, shall be considered a violation of this permit.

- (d) The instruments used for determining parameter measurements shall comply with Section C - Instrument Specifications, of this permit, shall be subject to approval by IDEM, OAQ, and shall be calibrated at least once every six (6) months. **Calibration of the reformer process vent valve monitoring system shall include a procedure that verifies functionality of open/closed valve operations.**
 - (e) Additional inspections and preventive measures shall be performed as prescribed in the Preventive Maintenance Plan.
5. Condition D.1.10(b)(1) (Record Keeping Requirements) is revised to reflect the changes described above regarding the amount of process vent opening. This condition is also revised at (b)(2) and (c) for recording of SCR system downstream temperature, which is currently an existing requirement of (c), but is more appropriately placed at (b)(2). Further, paragraph (c) has been combined into (b)(2) in order to consolidate the record keeping requirements for Reformer No. 3.

D.1.10 Record Keeping Requirements

- (b) To document compliance with Conditions D.1.2 ~~and~~, D.1.3, **and D.1.4**, the Permittee shall maintain records in accordance with (1) through (5) below. Records maintained for (1) through (5) shall be taken continuously, except where otherwise indicated. Including paragraph (a)(1) of this condition, the records shall be complete and sufficient to establish compliance with the CO and NO_x emission limits respectively established in Conditions D.1.2 and D.1.3, **and the ammonia emission limit of D.1.4.**
 - (1) The continuous records for Reformer Nos. 1, 2 and 3 as follows:
 - (A) vent valve opening duration ~~and amount~~ for each process vent connected to, and exhausting at, stacks S/V 006, 010 and 012 during startup of Reformers 1, 2 and 3, respectively; and
 - (B) carbon monoxide production at Reformer Nos. 1, 2 and 3 process vent stacks (S/V006, 010 and 012, respectively) and the continuously computed amount of carbon monoxide emitted.
 - (2) The continuous records for Reformer No. 3 as follows:
 - (A) average flue gas oxygen content of the reformer cans (percent, %, wet);
 - (B) capacity as a fraction of design firing rate; ~~and~~
 - (C) **continuous records of the SCR system downstream temperature (EF); and**
 - (D) ammonia injection rate (pounds per hour) to the SCR system and the minimum **and maximum** ammonia injection rate used to demonstrate compliance during the most recent compliance stack test.
- (c) ~~To document compliance with Condition D.1.4, the Permittee shall maintain records in accordance with (1) through (2) below. Records maintained for (1) through (2) shall be taken continuously, except where otherwise indicated. Including paragraph (b)(2) of this condition, the records shall be complete and sufficient to establish compliance with the ammonia emission limit established in Condition D.1.4.~~
 - (1) ~~continuous records of the SCR system downstream temperature (EF); and~~

(2) ~~the maximum ammonia injection rate used to demonstrate compliance during the most recent compliance stack test.~~

- (dc) To document compliance with Conditions D.1.5 and D.1.9, the Permittee shall maintain a log of those inspections prescribed by the Preventive Maintenance Plan.
- (ed) All records shall be maintained in accordance with Section C - General Record Keeping Requirements, of this permit.

Conclusion

The proposed permit modification to this existing industrial gas manufacturing source shall be subject to the conditions of the attached Part 70 Significant Permit Modification No. 089-17479-00435.